Semin G

NATIONAL DEFENSE UNIVERSITY
NATIONAL WAR COLLEGE

TECHNOLOGY OR DOCTRINE, SEARCH FOR BALANCE

CORE COURSE PAPER

LTC Walter A. Vanderbeek
Class of 94
Seminar G
CAPT Cole
COL Allard

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
1994		**00-00-1994 to 00-00-1994**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Technology or Doctrine, Search for Balance	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **National War College,300 5th Avenue,Fort Lesley J. McNair,Washington,DC,20319-6000**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT
see report

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**		**13**	

Introduction

> I am tempted to declare dogmatically that whatever doctrine the Armed Forces are working on new, they have it wrong.[1]

Throughout the last two centuries, modern armed forces and their leaders have been generally confounded in their attempts to develop effective war fighting doctrine. Their success at this endeavor has been sporadic at best. Armed forces have characteristically gone through an extremely hurried process to correct doctrinal and technological shortfalls that became apparent only during the course of conflict. In most cases, these doctrinal shortfalls were related directly to the inability of the armed forces to recognize technical advances in various systems readily adaptable to the science and art of warfighting.

Recent history has shown that the battlefield effectiveness of modern armed forces has been largely dependent upon their ability to analyze correctly and incorporate available technology into combat systems that enhance tactical techniques, procedures, organizations and doctrine. Successful armed forces have been able to integrate advanced technology in the development of warfighting doctrine and arrive at a superior method for the conduct of military operations. These relatively few successful

---

[1]Michael Howard, "Military Science in an Age of Peace," Journal of the Royal United Services Institute (London, England: Mar 1974), pp. 7.

armed forces were prepared to fight the "right" war, as the synergistic effect of technology and complimentary doctrine became the dominate force on the field of battle. This dominance led to initial overwhelming tactical and operational success and directly contributed to their subsequent strategic victory.

Two critical points have become apparent to the casual observer. The first concerns the ability of the armed forces to determine with a degree of certainty that available technology has been fully integrated into, and is complimentary to, existing doctrine. The second point questions the visionary aspect of doctrine. Is current doctrine capable of absorbing changes brought by the impact of technological advances in warfighting, or are major changes required to ensure an effective compliment between the current and soon to be available ways and means? Whatever course is taken, it is apparent that the essence of modern war has changed radically since the conclusion of Desert Storm, and will continue to evolve at an ever increasing rate.

It is therefore of utmost importance to our armed forces that its leaders recognize the opportunities available to develop an effective technology-doctrine marriage. But which of the available technologies and their subsequent impact upon doctrinal development are the most important, and which technologies should remain on the periphery?[2]

This paper presumes that the basis for the effective

---

[2]Michael J. Mazarr, The Military Technical Revolution, Final Report of the CSIS Study Group (Washington D.C.: Center for Strategic and International Studies, 1993, p. 28.

interface of technology and doctrine can be found in the mechanics of theoretical computer wargaming and in the observed results of practical field exercises. The thesis presented herein is that fundamental criteria can be developed and applied to those exercises to validate the technological proposals sufficiently for their incorporation into doctrine with a reasonable degree of confidence that the result will be effective on a future battlefield.

Theory

In the ideal world, doctrine would be developed first and drive all other decisions dictating what kinds of military forces need to be deployed and what equipment they require. In the real world, the process is interactive. Current and future technological availability will show the doctrinaire what their forces might be capable of. This knowledge will allow them to devise the tactics to take advantage of those capabilities.[3]

Theory indicates that the establishment of an institutionalized system to identify the correct technology-doctrine interface will be very difficult. The most pressing problem to be solved is to visualize correctly the future battlefield and determine the applicability of current and developing technology and doctrine. The ability to anticipate future technological and/or doctrinal requirements requires visionary depth to a degree seldom found. However, such vision is a prerequisite for the establishment of a even rudimentary

---

[3]IBID, p. 18.

validation process.

Two notable military scientists have written extensively on the capabilities of the military to establish a validation process to verify the correctness of technical and doctrinal developments. Michael Howard has stated that the establishment of a validation process will be difficult at best and impossible at worst. This is because it is nearly impossible to verify the correctness of your ideas in an environment in which all phenomena are changing at a bewildering rate.[4] Additionally, the process is hampered by the existence of numerous military bureaucracies which resist innovation and original thought or are so enamored with technological gadgets that they loose sight of doctrinal implications. Professor Howard finally states that with all things considered, what really matters is the ability of the military to prevent its peacetime doctrine from being too badly wrong, and to maintain the capacity to get it right quickly when the occasion arises.[5]

An opposing view is presented by I.B. Holley who believes it is possible to develop an intellectual process of generalization from which effective and "correct" doctrine is derived.[6] Dr.

---

[4]Michael Howard, "Military Science in an Age of Peace," Journal of the Royal United Services Institute (London, England: Mar 1974), pp. 5-7.

[5]IBID, p. 7.

[6]Irving Benton Holley, "The Doctrine Process: Some Suggested Steps." Military Review (Ft. Leavenworth, KS: U.S. Army CGSC, April 1979), p. 5.

Holley believes that the development of a comprehensive system or procedure to evaluate doctrinal concepts is not only possible but is required. He recommends the institutionalization of a codification process to study the causes of success or failure of new concepts as illustrated by the observations generated by simulations, field exercises and actual combat.

Theory then suggests that it will be difficult but possible to develop a process to validate the applicability of adopting advanced technological concepts in doctrinal development. The process should contain a set of criteria that can be applied to validate those exercise results and finding experienced during simulations and exercises. A key component to the successful utilization of this criteria will be the intellectual honesty of the evaluations by learned and experienced military scientists. The following criteria are presented for use in evaluating the validity of the impact on technology on doctrine:

1) Does the application of the technology in question demonstrate a significant increase in the armed forces' capability to wage combat? This first criterion concerns the overall effectiveness of the subject technology and its adaptability to military operations. In order for a new technology to be adaptable, it must provide or enhance a significant combat capability and therefore effect how doctrine is to be applied across the full spectrum of combat operations. The technology must impact at more than just the tactical level of war. The key to this criterion is analyzing not what the

technology can do in isolation, but what does it do to improve the manner in which the armed forces are able to fight across the full spectrum of operations in those conflicts that it believes to be likely.[7] Also as part of this criterion, the technology must be evaluated regarding potential combat capabilities and their impact upon the current armed forces organizations and strategies. The emergence of revolutionary technologies might be the enabling mechanisms for the realization of the need for new doctrine and strategies.[8]

2) Is the evaluated technology available in sufficient quantities to make an impact upon the war fighting capabilities of the armed forces? This criterion deals with the employment of technology in quantity. Quality will beat quantity more often than not, but there has to be enough of it for its influence to be felt.[9] History is full of instances where advanced technology was introduced to combat operations initially in quantities too small to allow the full realization and appreciation of its potential impact. For example, the failure of military observers to quickly realize the doctrinal implications that the breech loading rifle introduced to the battlefield was due in no small measure to the initial comparative scarcity of that particular

---

[7]Dan Goure, "Is There a Military-Technical Revolution in American's Future?", The Washington Quarterly. 16 (Autumn 1993): p. 184.

[8]IBID, p. 184.

[9]Benjamin S. Lambeth, "Desert Storm and Its Meaning: The View From Moscow." RAND, as it appeared in Aviation Week and Space Technology, Oct. 5, 1992.

weapon system on the battlefield. Breech loading technology, in fact, increased tremendously the rate of fire of individual rifles and made it possible for soldiers to load from the prone or running positions. The individual soldier, and the combat organization to which he belonged was now capable of much higher rates of fire. These developments were observed and recorded but their doctrinal implications were never fully realized due to the extremely limited number of weapons and occasions where they were employed in anything close to significant numbers. However, once those weapons were used in quantity, the breech loader coupled with the rifle, significantly contributed to the defense becoming stronger form of combat. An adequate degree of quantity is essential to realize the full potential of new technology; and once that potential is understood, mechanisms should be available to exploit the advantage to the maximum extent possible.

3) As I have stated previously, the most capable and advanced technological systems are of no use if they are not employed in a quantity that enables them to make a difference. This leads to the third criterion, which is a corollary of the above statement. This criterion states that it logically follows that if the systems in question are to be employed in numbers, than that technology must be affordable. Fiscally practical technology can only impact upon doctrine and strategy if it can be done in numbers. Emerging technology is expensive. These expenses tend to force the development and implementation of technology to take on a life of its own, which at times can run

contrary to the most efficient use of the systems being developed. It is very possible to develop a system that costs too much to be allowed to be threatened in combat.

4) It does no good to spend resources developing technological systems if those systems can be neutralized by a single simple change in the opponents' scheme of operations. Likewise, it is counter productive to develop technologies that are volatile in nature, subject to rapid obsolescence. Therefore, the fourth criterion dictates that an emerging technology must possess a degree of longevity. It must demonstrate a capacity to outperform possible countermeasures as well as exhibit a certain amount of "growth potential". For example, the United States spent a considerable amount of resources on the development of the Tube Launched Optically Tracked Wire Guided (TOW) Missile. This weapon system was state-of-the-art technology when first introduced and promised to end the domination of armour on the battlefield. However, it was found that the effects of the weapon system could be effectively countered through the enemys' use of low-tech defensive systems such as smoke and reactive armour. The Israeli Defense Force learned this lesson during the 1973 Arab Israeli War. The second part of this criterion is more difficult to cope with. Technology is advancing at nearly exponential rates. It is not uncommon for a weapon system undergoing development to experience numerous engineering changes due to the availability of emerging technology that was not feasible during the initial design

phases. The technologies that are to be adaptable must have some characteristics that are enduring in nature. These characteristics must be able to become the building blocks upon which follow-on technological developments are based.

5) The final criterion deals with the ability of the proposed technology to compliment other existing or proposed technologies and doctrine in order to further the synergistic effects on the battlefield. For example, stealth aircraft would loose much of their effectiveness if they did not carry precision weapons to deliver when they reached their targets. Even with precision weapons, if they were not adequately targeted before their missions and controlled during them, those aircraft would have been only marginally more effective than previously existing less technical ones. Only when the various capabilities are working together will the full potential for the technology-doctrine links be realized.[10] We must avoid the introduction of technologies that "stand alone" because they threaten the orderly evolution of doctrine and bias the manner in which systems developments are analyzed.

Conclusion

Michael Howard makes it clear that doctrinal development in peacetime is difficult at best. It is one activity where one cannot verify one's calculations because of the unique

---

[10]Mazarr, Op.Cit., p. 22.

characteristics of the battlefield.[11] However, Howard wrote in the comparative technological stone age. Technology has given us a double edged sword. On one side it has presented us with the dilemma of determining which of the rapidly advancing technologies are to be pursued and utilized to reach our full warfighting capabilities and how do we fully integrate those capabilities into a complimentary warfighting doctrine. On the other hand, technology by way of its incorporation into sophisticated wargaming has given us an invaluable analysis tool. This tool can be utilized in the systematic evaluation of the potential impact of other emerging technologies upon current and proposed doctrine. These computer assisted simulations have allowed us to create an environment which closely approximates the realm of warfare where the various parameters are always changing. An environment now exists where we can closely approximate the interactive environment of war in order to analyze the probable impacts of advanced technologies and new doctrine.

It is now theoretically possible to utilize the previously presented criteria when analyzing observations from various exercises to provide an initial validation of new technological systems and their impact upon doctrine. This may be able to provide the basis for a reasonable degree of confidence that the resulting technology-doctrine mix will be effective on the future battlefield.

---

[11]Howard, Op. Cit., p. 7.

The validation criteria can be capable of developing a nearly correct technology-doctrine mixture when used in an objective manner to examine observations derived from simulated engagements in computer assisted wargames. The criteria are composed of basic elements that retain relevancy regardless of the technology-doctrine aspect that is being evaluated. The application of the proposed criteria allows potential deficiencies as well as strengths in proposed technology and doctrine to be identified.

In all probability, the armed forces will never be able to have its technology-doctrine mix entirely correct at any given time. However, the proposed criteria can be applied to validate the correctness of the proposed mix and in turn help ensure that we are not "too badly wrong."

Bibliography

Books

Addington, Larry H., The Patterns of War Since the Eighteenth Century, (Bloomington, Ind: Indiana University Press, 1984)

Duprey, Trevor N., The Evolution of Weapons and Warfare, (Fairfax, VA: Hero Books, 1984)

Holley, Irving Brenton, Ideas and Weapons: Exploitation of the Aerial Weapon by the United States During World War One: A Study in the Relationship of Technological Advance, Military Doctrine, and the Development of Weapons, (New Haven, Conn.: Yale University Press, 1953)

Ropp, Theodore, War in the Modern World, (New York, New York: Macmillan Publishing Company, 1962)

Articles and Periodicals

Fulghum, David A., "Planners Seek to Exploit U.S. Technology Lead," Aviation Week and Space Technology, January 17, 1994.

Goure, Dan, "Is There a Military-Technical Revolution in America's Future?" The Washington Quarterly #16, (Autumn 1993)

Holley, Irving Brenton, "The Doctrinal Process: Some Suggested Steps," Military Review, April 1979.

Howard, Michael, "Military Science in an Age of Peace," Journal of Royal United Services Institute For Defense Studies, March, 1974.

Lambeth, Benjamin S., "Desert Storm and its Meaning: The View From Moscow," RAND, as published in Aviation Week and Space Technology, Oct. 5, 1992.

Mazarr, Michael J., "The Military Technical Revolution, Final Report of the CSIS Study Group" (Washington D.C.: Center for Strategic and International Studies, 1993)

Morrocco, John D., "U.S. Uses Gulf War to Frame New Strategy," Aviation Week and Space Technology, January 17, 1994.

Selvasy, MG Stephen, "Air Land Battle Future: The Tactical Battlefield," Military Review, February 1991.